ORIGINAL ARTICLE

PREVALENCE OF ANEMIA IN SCHOOL AGE CHILDREN

Alka Rao, Arun Parikh

Assistant Professor, Department of Paediatrics, Gujarat Adani Institute of Medical Science, Bhuj, Gujarat.

ABSTRACT:
The present study aimed to estimate the prevalence of iron deficiency anemia (IDA) in schoolgoing children. Both Iron deficiency and iron deficiency anemia have considerable adverse effect on human health. The sample was consisting of 500 school age children of both genders. The blood samples were collected in EDTA (Ethylenediaminetetraacetic acid) tubes from different school and health maternity centres by trained and veteran persons. Questionnaires were utilised for the data collection, at the time of blood samples collection. The total percentage of anemia recorded in school age children was 43%. The percentage was higher in girls than in boys. The anemia percentage was recorded high in lower socioeconomic family children, than middle class and upper class. The percentage of anemic children was also high in age group of 10 - 12 years. Pale skin was the most common symptom of anemia.
Keywords: Iron Deficiency, Anaemia, School Children

Corresponding author: Dr. Alka Rao, Assistant Professor, Department of Paediatrics, Gujarat Adani Institute of Medical Science, Bhuj, Gujarat

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INTRODUCTION

Iron deficiency (ID) is a state in which there is insufficient iron to maintain the normal physiological function of blood and tissues, such as the brain and muscles.[1] The more severe stages of ID are associated with anemia. Iron-deficiency anemia (IDA) occurs when the hemoglobin concentration is below two standard deviations (–2SD) of the distribution mean for hemoglobin in an otherwise normal population of the same sex and age. IDA is generally characterized by a hemoglobin level of less than 110 g/L, plus a measure of poor iron status.[2]

Children, particularly young ones, are more susceptible to anemia and ID because of high iron requirements during growth, low intake of iron from complementary foods, and frequent episodes of infection.[3] Breast milk contains relatively low levels of iron but it is readily absorbable and sufficient for infants up to six months of age. However, a longer duration of breastfeeding may increase the risk for ID. Extra iron is required from six months of age onward, either from complementary foods or as a supplement.[4]

Anemia which is detected by only hemoglobin (Hb) measurement has been widely used as a proxy for detection of ID and IDA. Although ID is the major cause of nutritional anemia in the developing countries, the very deficiencies of other nutrients like vitamin A, C, B9, B12, vitamin D, and zinc as well as toxicity of lead may also cause anemia and Hb alone is a poor predictor for detection of iron status. Moreover, the detection of anemia and ID may be obscured due to clinical or sub-clinical infections and concomitant multiple micronutrient deficiencies, which are common in developing countries.[5]

The Recommended cut-off value for anemia in children aged from upto 5 years is 110 g/L, 5 - 11 years 115 g/L, 12 - 14 years 120 g/L, adult males 130 g/L. The cut-off point for children <5 years of age is 11 g/dl; 7 - 10.9 g/dl and <7 g/dl Hb represent moderate and severe anemia respectively. The prevalence of ID in Turkey is 48% in infants, 21% to 42% in children and 14.7% in adult but that of IDA is 3.1% in children of age 06 - 16 years and 13.5% pregnant women.[6] In Canadian general population the prevalence of IDA in children is low 3.5% to

10.5% while in aboriginal populations is very high 14% to 50%. The high prevalence of IDA in these populations is due to high consumption of evaporated milk, cow's milk after six month age; prolong exclusive breastfeeding, burden of Helicobacter pylori infection, low socioeconomic states, and children of Chinese background, low birth weight infant and cow's milk consumption before 1 year age. The iron deficiency anemia affects 02 billion peoples worldwide. The prevalence of IDA is 05% worldwide but 18% among adult women and 10% in adult men in developing countries.[7]

MATERIALS & METHODS

The present study was designed to investigate the rate of low iron causing anemia in children in association with socio economic status, age education and dietary intake. For obtaining credible and consolidated data, a questionnaire was designed for this purpose. Some other research methods were used like observation, interviews from school going children by visiting of different primary schools (Male and Female) and hospital. The questionnaire included age, sex, social class, education, use of unfortified cow milk, black tea intake, vitamin supplementation drugs and dietary intake like factors. To know the scio economic status of the people, the study population was divided into 03 economic classes, including Lower, Middle and Upper class. There were also some refusals from respondents. But their number was quite insignificant, having no effect on study sample size. Informed Consent were signed by all the participants prior to the study and ethical clearance from the institutional review board was obtained.

A total of 500 blood samples were collected. For the collection of blood samples, collection site was cleaned with antiseptic liquid to kill germs. Blood was drawn from anticubital vein by means of sterilized syringes with the help of male expert from school going children and female nurse from female children. The drawn site was usually inside the elbow or back of the hand. The needle was carefully inserted into the individual vein and the blood was collected. About 01 - 03 ml blood was collected and poured into red tip EDTA (ethylene diamine tetra acetic acid) tube. During the blood collection the designed questionnaire were also filled from the participant.

The blood samples were immediately transported to the laboratory. The hemoglobin (Hb), hematocrite (Hct), mean corpuscular volume (MCV), mean corpuscular Hemoglobin (MCH), mean corpuscular hemoglobin concentration (MCHC), red blood cell count (RBC), white blood cell count (WBC), and platelet count were determined by automatic hematological analyzer. The WHO classification was used to characterize anemia in school going children (5 - 11 years) Hb<11.5 g per dL (115 g /L). The anemic patients were further divided into Mild anemia (11.0 - 11.9 g/dl) and 10 - 10.9 g/dl, Moderate anemia (10.0 - 10.9 g/dl) and 7.0 - 9.9 g/dl and severe anemia < 10.0 g/dl and < 7.0 g/dl respectively [18]. The individual whose Hb level was less than the standard level, a smear was prepared and observed under microscope. The low MCV and abnormal, small and pale RBC is microcytic anemia and consider iron deficiency anemia. Data collected was subjected to statistical package, SPSS for desired statistical application, including simple mean and standard deviations.

RESULTS

A total of 500 school age children (5 - 12 years) with both sexes (boys and girls) were interviewed and clinically examined for the presence of anemia. After clinical examination blood samples were collected for further analysis. Table 1 shows Anemia percentage in school age children. Children of the study sample were divided into two groups, anemic and non-anemic. The total anemic children were 45.0% and non-anemic were 55%. The mean Hb level of anemic children was 8.5. Table 2 shows Anemia relation with socio economic condition. The whole population was divided into three classes on the basis of monthly income. The prevalence of anemia was high (53%) in the children of lower class parents. 30% anemic children belong to middle class and 17% belong to upper class parents. The incidence of anemia was high in lower class family children because their daily dietary intake was not balance.

Table 1: Anemia association with socio-economic condition among school age children.

Socio-economic condition	Normal Hb level	Anemic (Hb< 11.5 g/dL)	Total
Lower class	60	75	135
Middle class	117	67	184
Upper class	108	73	181
Total	285	215	500

Table 2: Clinical signs and symptoms in anemic children

Signs & Symptoms	Anemic	Percentage
Pale skin	60	27.90
Weakness	70	32.55
Fatigue	50	23.25
Pale conjunctiva	35	16.27
Total	215	99.97

DISCUSSION

Iron deficiency (ID) is still a common nutritional deficiency in developing countries responsible for more than 50% of total anemia cases in children under 5.[8] Iron deficiency anemia (IDA), which is a severe form of ID, is associated with impairment of motor development and cognitive performance, as well as fatigue, sleep disturbance, irritability, and poor memory and school performance.[5] Clinical or subclinical inflammation may also cause anemia, which is common among children in resource-poor settings. An optimal balance of iron in our body is essential and both excess and deficiency may be harmful. Thus, more population-based information on iron status data is warranted for the development of an effective nutritional program to combat ID.[5, 9]

The incidence of anemia was high in girls as compared to boys, because most of the parents prefer to male children as compared to female children.[10] According to Verma et al. the prevalence of anemia was high in girls 51.1% among the urban school children of Punjab than boys except 05 years and 10 - 12 years age. In Bangalore district of South India the prevalence of anemia in girls (15.3%) was also high than boys (12.0%) The low prevalence in Bangalore was due to school based intervention program that have been conducted 2003. In Rishikesh, Utterakhand, India the percentage of anemia was 56.5% in school age children.[10] There was high proportion (36.5%) in menarcheal girls. 90.90% anemic children were belonging to lower socio-economic family. The most common anemia was microcytic hypochromic type. It indicates that it is due to lack of nutrition.

The percentage of anemia was high in age groups (10 - 12 years) and (08 - 10 years) children as compared to age groups (05 - 08 years) child because at this age the children body requires balance nutrition for rapid growth. The percentage of Mild anemia (Hb 10 to < 11 g/dL) (46.8%) in children was high followed by moderate (Hb> 7 to < 10 g/dl and severe anemia (Hb< 7 g/dl). The percentage of mild anemic (11.2%), moderate anemic (2.1%) and severe anemic were (0.3%) in school age children of Bangalore which was similar in present study.

CONCLUSION

Anemia prevalence in study region is classified as a moderate public health problem, with greatest impact in children aged 5 – 8 years. Moreover, it is classified as a severe problem for the group aged in this region. Recommendations include continuation and strengthening of anemia control actions for women of childbearing age, such as exclusive breastfeeding for six months and compliance with Cuban guidelines on complementary feeding for children ≤2 years. Further research is needed into the causes of anemia in the preschool population.

REFERENCES

1. De Domenico I, Ward DM, Kaplan J: Regulation of iron acquisition and storage: consequences for iron-linked disorders. Nature Reviews Molecular Cell Biology 2008, 9:72-81.

2. Abdullah K, Zlotkin S, Parkin P, Grenier D: Iron-deficiency anemia in children. Ottawa: Canadian Pediatric Surveillance Program, Canadian Pediatric Society Retrieved May 2011, 21:2013.
3. Crawley J: Reducing the burden of anemia in infants and young children in malaria-endemic countries of Africa: from evidence to action. The American journal of tropical medicine and hygiene 2004, 71:25-34.
4. Faruque A, Ahmed AS, Ahmed T, Islam MM, Hossain MI, Roy S, Alam N, Kabir I, Sack DA: Nutrition: basis for healthy children and mothers in Bangladesh. Journal of health, population, and nutrition 2008, 26:325.
5. Chandyo RK, Ulak M, Adhikari RK, Sommerfelt H, Strand TA: Prevalence of Iron Deficiency and Anemia among Young Children with Acute Diarrhea in Bhaktapur, Nepal. Healthcare: Multidisciplinary Digital Publishing Institute, 2015. pp. 593-606.
6. Balarajan Y, Ramakrishnan U, Özaltin E, Shankar AH, Subramanian S: Anaemia in low-income and middle-income countries. The Lancet 2012, 378:2123-35.
7. Christofides A, Schauer C, Zlotkin SH: Iron deficiency anemia among children: Addressing a global public health problem within a Canadian context. Paediatrics & child health 2005, 10:597.
8. Horton S, Ross J: The economics of iron deficiency. Food policy 2003, 28:51-75.
9. Kontic-Vucinic O, Terzic M: Current Status Of Micronutrient Supplementation In Pregnancy. Micronutrients and Health Research 2008:107.
10. Brabin BJ, Premji Z, Verhoeff F: An analysis of anemia and child mortality. The Journal of nutrition 2001, 131:636S-48S.

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